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CHAPTER IV

TOBACCO USE AS DRUG DEPENDENCE

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Introduction

This Chapter reviews the evidence that tobacco is a pharmacologically addicting substance and that tobacco use can be considered a form of drug addiction. Specific criteria to identify a substance as pharmacologically addicting are discussed in Chapters I and V. In brief, the criteria are: (1) that highly controlled or compulsive patterns of drug taking occur, (2) that a psychoactive or mood-altering drug is ingested by use of the substance and is involved in the resulting patterns of behavior, and (3) that the drug is capable of functioning as a reinforcer that can directly strengthen behavior leading to further drug ingestion. Addicting drugs can be characterized by other properties that include the following: they can produce pleasurable effects in users, they can cause tolerance and physical dependence, and they can have adverse or toxic effects. Drawing upon data from studies of tobacco and nicotine, involving both humans and animals, the present Chapter reviews the evidence that tobacco meets the criteria as a pharmacologically addicting substance. A specific comparison of tobacco to other pharmacologically addicting substances is provided in Chapter V.

Cigarette Smoking: Controlled Drug Self-Administration

Highly controlled or compulsive drug use refers to drug-seeking and drug-taking behavior that is driven by strong, often irresistible urges. It can persist despite a desire to quit or even repeated attempts to quit.

Basic observations and experimental research indicate that cigarette smoking is not a random or capricious behavior that simply occurs at the will or pleasure of those who smoke. Rather, smoking is the result of behavioral and pharmacologic factors that lead to highly controlled or compulsive use of cigarettes. The highly consistent patterns of cigarette smoking illustrate the controlled nature of the behavior. For example, following initiation of smoking the individual gradually increases cigarette intake over time until he or she achieves a level that remains stable, day after day, during the smoker's lifetime (Schuman 1977; US DHHS 1987a). The dependent smoker tends to adopt a pattern in which the initial cigarette of the day is smoked soon after waking (Fagerström 1978) and in which smoking throughout the day is regular from day to day (Griffiths and Henningfield 1982; Griffiths, Henningfield, Bigelow 1982). "Occasional" cigarette smoking (or "chipping") occurs just as does occasional use of other addicting drugs (see Chapter V); however, the 1985 National Health Interview Survey showed that only 10.6 percent of current smokers smoke 5 or fewer cigarettes/day (unpublished data, Office on Smoking and Health; see also Russell 1976 and US DHHS 1987a).

Strong evidence that cigarette smoking is a highly controlled or compulsive behavior is provided by survey data showing that a majority of smokers have tried to quit or at least would like to quit. For example, several Gallup surveys have shown that a large majority of smokers report a desire to quit smoking; in fact, the proportion of smokers who would like to quit increased from 66 percent in 1977 to 77 percent in 1987 (Gallup 1987), perhaps because of a declining social acceptability of smoking and the growing awareness of the health hazards of smoking. In addition, the 1986 Adult Use of Tobacco Survey (US DHHS 1987b) showed that 65 percent of cigarette smokers had made at least one serious attempt to quit; another 21 percent said that they would try to quit "if there were an easy way to do so" (Fiore et al., in press; US DHHS 1986).

The compulsive nature of cigarette smoking is most apparent in extreme cases: for example, the laryngectomized patient who, having already suffered severe consequences of smoking, continues to smoke through a tracheostomy hole. Similarly, 50 percent or more of patients recovering from surgery for a smoking-related disease (e.g., cancer, cardiovascular disease) resume smoking while in the hospital or shortly after discharge (Burling, Singleton et al. 1986; West and Evans 1986).

In this Section, the behavioral process of cigarette smoking and the factors which determine the course of the behavior are described. Evidence that cigarette smoking is repetitious and stereotypic, common features of compulsive drug use, is reviewed in this Section, as well as evidence that actions of nicotine are responsible for patterns of smoking behavior. Initially, however, it is necessary to briefly review the methods by which the behavioral process of cigarette smoking is studied, as well as the main findings from such studies.

Measurement of Cigarette Smoking

Cigarette smoking behavior may be analyzed at different levels ranging from epidemiological surveys to the analysis of cigarette puffing. In fact, many thousands of scientific articles have been published in which some aspect of cigarette smoking is described. Much of this research has been reviewed in the tobacco research compendia of Larson and his colleagues (Larson, Haag, Silvette 1961; Larson and Silvette 1968, 1971, 1975), a previous report of the Surgeon General (US DHEW 1979), several monographs of the National Institute on Drug Abuse (NIDA) (Jarvik et al. 1977; Krasnegor 1978, 1979a,b,c; Grabowski and Bell 1983; Grabowski and Hall 1985) and in articles by others (Russell 1971, 1976; Gritz 1980; Henningfield 1984).

It is characteristic of drug dependence that the drug-seeking and self-administration behaviors become stereotypical and automatic in